MARIO BEAUREGARD

EXPANDING REALITY

THE EMERGENCE OF POSTMATERIALIST SCIENCE

Contents

From the same author

Brain Wars, HarperCollins, 2012
The Spiritual Brain (with Denyse O'Leary), HarperCollins, 2007

Foreword

Gary E. Schwartz, PhD[1]

If at first an idea is not absurd, then there is no hope for it.
Albert Einstein

May this book transform your life by finally liberating you from the materialist straitjacket.
Mario Beauregard

The history of science reminds us that science is, first and foremost, a careful step by step process of creative discovery and application. As Ted Arroway, a character in the 1997 movie *Contact* said to his budding young daughter and future astrophysicist, Dr. Ellie Arroway, "small moves, Ellie, small moves."

However, every now and again, scientists take "small steps" that prove to be "giant leaps" for the evolution of human understanding and life in general. Thomas Kuhn, the distinguished historian and philosopher of science, called these revolutionary transformations in human understanding "paradigm changes."

Interestingly, in each instance the revolutionary "small" step/idea was "simple" and frameable in a single sentence even though its giant implications and applications were complex and far reaching. These revolutionary ideas and implications

challenged the prevailing established beliefs, and they were typically perceived by most of the scientists and public in their day as being wrong, impossible, and even "absurd."

Historical examples of small/simple steps that have become giant/transformative leaps for humanity include:

1. The idea that the earth is round
2. The idea that the earth revolves around the sun
3. The idea that time and space are relative, and
4. The idea that seemingly solid matter is composed of quanta of energy whose properties defy common sense and experience

As Dr. Mario Beauregard clearly and convincingly presents in *Expanding Reality: The Emergence of Postmaterialist Science*, science is experiencing another paradigm change whose revolutionary implications may be even more transformative for science and society than 1-4 above. Not only are the implications of postmaterialist science far reaching for humanity, they have the potential to resolve the historic as well as contemporary war between science and religion, and in the process, enhance the prospect for global healing and peace.

The small step that is a giant leap for humankind is:

5. The idea that consciousness is a core property of universe, not only on a par with physical fundamental properties – e.g., information, energy, and matter – but even more primary.

It is virtually impossible to read Beauregard's comprehensive and engaging presentation of the emergence of postmaterial

science and not see reality in a new, expanded way. Like Beauregard's previous books, *The Spiritual Brain* and *Brain Wars*, *Expanding Reality* provides a delicious four course meal of historical context, scientific evidence, personal perspective, and big picture analysis that leaves the reader in a state of wonder, awe, and hope.

I was inspired to contact Dr. Beauregard after reading his previous books. We quickly discovered how similar and complementary our emerging perspectives were, and I invited him to join me and Lisa Miller in organizing the International Summit on Postmaterialist Science, Spirituality, and Society held in Tucson in February 2014. This visionary meeting – Mario calls it a "Pivotal Event"– resulted in many practical collaborative products, including a book edited by Mario Beauregard, myself, Natalie Dyer, and Marjorie Woollacott titled *Expanding Sciences: Visions of a Postmaterialist Paradigm*.

It takes knowledge, skill, vision, inspiration, and courage to write a big picture book whose topics range from "Thoughts that Transform the Body" (Chapter 1) to "Journeys to the Source" (Chapter 8). Like other paradigm-changing books in the history of science, *Expanding Reality* will receive both praise and distain. Speaking bluntly, some readers will love this book and others will despise it. This extreme diversity of opinion comes with the territory, as the author of *Brain Wars* knows firsthand.

In my chapter in *Expanding Science* titled "Extraordinary Claims Require Extraordinary Evidence: The Case for Postmaterial Consciousness," I discuss what I call the Kepler Challenge as expressed by Dr. Carl Sagan, the distinguished astronomer and skeptic.

> *When he [Johannes Kepler] found that his long-cherished beliefs did not agree with the most precise observations, he accepted the*

uncomfortable facts.

He preferred the hard truth to his dearest delusions, that is the heart of science.

Dr. Beauregard encourages us to be genuine truth seekers. He invites us to practice – and celebrate – the "heart of science," and thereby be liberated from the straitjacket of materialism. Once again, it is time for us to expand our hearts and minds.

Introduction: The Downfall of Scientific Materialism

Consciousness cannot be accounted for in physical terms, for consciousness is absolutely fundamental. It cannot be accounted for by anything else.
Erwin Schrödinger

The Essence and Origin of My Research

Certain members of the general public, as well as journalists, sometimes inquire as to why I conduct research on consciousness, transcendental experiences and brain-mind relationships.[2] Until now, eager to protect my reputation, I have remained vague on the subject. As this no longer matters, I have decided to be honest and address those questions in this book.

As a scientist, empirical evidence related to my research has been crucial in the key thematic areas addressing specific sectors of my research program. This observation, or experimentation-based evidence, is analyzed in the chapters that follow. However, to be honest, my work as a researcher has been primarily influenced by significant first-hand spiritual experiences at various instances in my life.

Since I do not consider myself a guru and do not wish to risk marginalization, this book will not focus on these experiences. I do need, however, to mention some of them briefly to shed some light on me and my roots. The first one occurred when I was only eight years old.

My parents' farm was found near a vibrant and mysterious forest, which I explored every now and then. On one beautiful

summer day back in 1970, I ventured into the entrancing woods. It was hot, and after walking for some time, I realized I was exhausted. I sat down on a large grey rock and gazed at the magnificent trees around me. After a few minutes, I started to feel a strong connection with the trees and the rock – I could sense that they were imbued with life. It felt like the rock, the trees and I were part of a much larger whole, much bigger than my "small self." My life's goal became very clear following this powerful experience – I would become a scientist who would help demonstrate that the human essence is not determined by the brain.

Some twelve years later, a new life cycle began for me. This new cycle was also marked by various determining spiritual experiences. It was new, as until then, I had been blessed with perfect health. Not anymore.

One January morning in 1982, I woke up to find that my body was not functioning like it did the day before, and that my visual perception was dramatically altered. I felt completely drained of energy, and my stomach, back, and multiple joints were hurting. I also felt dizzy and nauseated, and my breathing was labored. I was experiencing a kind of mental fog and my visual perception of the outside world was not the one I was used to. In fact, all the objects in my line of vision seemed to be continuously whirling.

I felt way too sick and weird to attend my classes at university. I did not understand what was happening, but I was convinced that it was something serious. The next evening, I called my parents to tell them about my predicament. They asked me to return home as quickly as possible – which I managed to do the very next day, after gathering all my willpower, but not without difficulty and misery.

I stayed in bed for almost a year. Weak and barely feeding myself, I had no other choice than to temporarily drop out of university.

My parents were desperate and utterly helpless. We agreed that we had to find the underlying source of my condition, which might be the solution to my problem.

My mother took me to see several medical specialists, including a neurologist, a psychiatrist, an ophthalmologist, a gastroenterologist and an internist. Some of these doctors decided not to further the investigation, dismissing me as a hypochondriac. One doctor, claiming I was showing signs of schizophrenia, prescribed an antipsychotic which I threw out right away. The other medical specialists, puzzled by the mysterious accumulation of my symptoms, subjected me to a battery of tests – all negative.

I could feel myself slowly withering away and I could not reconcile what I was going through with the experience that had left such a mark on my childhood. It did not seem to make any sense and it filled me with bitterness – I would never be able to accomplish my life's mission in such a deplorable state. I found myself in a very dark place and suicidal thoughts started to creep into my consciousness – I could not live like this anymore.

One evening, I was so desperate that I mentally bellowed at the sky. Apparently, my supplication did not fall on deaf ears, as a few days later, in the middle of the night, I suddenly felt that I was leaving my physical body through my heart. I then sensed a Being of Light, radiating immense and unconditional love. The Being of Light reassured me telepathically that what I was experiencing was no disease, but rather a process of transmutation. He also told me that I was not alone and that I had to hang in there. Moreover, to restore my confidence, this Being of Light told me about events that would take place shortly, and he also mentioned that the severity of my symptoms would gradually decrease over the following months. All the Being of Light's predictions came true. Many other things happened during this life-defining episode, but I will not

mention them as the main purpose of this book is not to share my personal experiences.

After that, I mustered enough strength to resume my studies, and my symptoms faded slowly but surely, just like the Being of Light had predicted. Still, getting back on my feet was no easy task.

Seven years after my health problems first started, a friend introduced me to a famous doctor and microbiologist at the Hôtel-Dieu Hospital in Montreal. The latter performed a thorough battery of medical tests. He detected the presence of viral agents in my body – the Epstein-Barr virus, cytomegalovirus and Coxsackie virus. Together, these viruses could explain most of my symptoms. I also learned that I had cerebral vasculitis, an inflammation of the blood vessels of the brain. The severity of the viral infections left the microbiologist bemused as to how I had managed to remain on my feet and continue with my studies.

It took me twelve long years to get back in perfect health. During this life cycle, my psychic faculties developed remarkably, and I have remained in close contact with the spiritual world since this lengthy episode.

I saw the microbiologist again one last time when everything was over. He told me that there was no explanation for my remission, which was simply "miraculous," from a medical point of view.

Science is Not Tantamount to Materialism

It may seem surprising to many readers, but most contemporary men and women of science are unaware that the "modern scientific worldview" is largely based on metaphysical assumptions, that is, assumptions about the nature of reality.[3] These assumptions were first put forward by ancient Greek philosophers who preceded Socrates. These philosophers,

referred to as "Pre-Socratic," proposed several interesting ideas and theories that are now available to us.

At first glance, this crass ignorance, which also characterized many scientists from previous generations, may not seem so important. However, this is not the case, as such ignorance has had considerable negative impacts. Indeed, this ignorance is largely responsible for the delay of science in the fields of research related to human interiority. This becomes evident if we take as a point of comparison scientific fields geared towards technological development. Furthermore, it is this ignorance that has made most scientists prisoners of an ideological trance that has lasted a few centuries. This is hardly surprising since knowledge, especially when disinterested, is the best antidote against ideology.

Several centuries after the Pre-Socratics, the philosophical postulates, which formed the vision of the modern scientific world, became associated with classical physics. These postulates include *materialism*, the idea that matter is the only reality and that everything in the universe is composed of sets of material particles and physical fields[4] – as well as *reductionism*, the notion that complex things can only be understood by reducing them to the interaction of their parts or to simpler or more basic things, such as material particles. Other postulates include *determinism* – the idea that future states of physical or biological systems can be predicted based on their present states – and *mechanism*, the notion that the world functions as a huge machine determined by immutable physical laws.

For the founding fathers of classical physics – such as Galileo, Descartes and Newton – these philosophical postulates were useful hypotheses that could guide them in their exploration of the material world. However, these pioneers of modern science, who were also spiritual men, did not believe that the world could be reduced only to its material dimension. But this crucial

nuance ends up being forgotten by their successors, and during the nineteenth century, the postulates in question were changed into dogmas and united to form a system of beliefs that became known as "scientific materialism."

This belief system implies that our consciousness and everything we experience subjectively – for example, our perceptions, our thoughts, our emotions, our memories, our free will, our sense of personal identity and our spiritual illuminations – is identical or can be reduced to electrical and chemical processes taking place in our brain. Moreover, scientific materialism posits that our thoughts cannot affect our brain, body, actions, and the physical world. In other words, human beings are complex biophysical machines only, and therefore, our personality and our consciousness return to oblivion when we die.

Materialist ideology became extremely dominant in the academic milieu during the twentieth century. So dominant, in fact, that most scientists started to believe that this ideology was based on empirical evidence and that it represented the only possible rational conception of the world. Scientists also tacitly understood that they could endanger their careers if they dared to question this dogmatic and intolerant ideology.

We must admit that scientific methods based on materialist philosophy have proved highly successful as they have led to a better understanding of nature, as well as greater control and freedom through technological advances. However, the almost absolute dominance of materialism in the academic world has greatly stifled science and hindered the development of the scientific study of the mind, consciousness and spirituality. Faith in this ideology, as an exclusive explanatory framework of reality, has led scientists to neglect the subjective dimension of human experience. Scientific materialism has also brought a

severely distorted and impoverished conception of ourselves and of our place in nature.

Science is first and foremost a non-dogmatic and open method of acquiring knowledge about nature. This method is based on observation, experimental investigation and theoretical explanation of phenomena. In this sense, science is not tantamount to materialism and should not be influenced by any belief, dogma or ideology.

The "Dematerialization" of the World

In April 1900, British physicist Sir William Thomson, also known as Lord Kelvin, asserted with confidence, at a conference he gave at the Royal Society of London, that there was practically nothing left to be discovered in physics. Lord Kelvin, however, recognized that two "little clouds" darkened the serene sky of his discipline – the problem of ether and that of blackbody radiation. He also claimed that these minor problems, which were anomalies for classical physics, would soon be solved by refining the existing theories. Lord Kelvin could not be more mistaken as these two little clouds shook physics to its very core – the ether problem was eventually solved by the theory of relativity while that of blackbody radiation was solved by Max Planck who proposed a bold hypothesis that soon led to the birth of quantum mechanics (QM), a revolutionary branch of physics.

This new physics invalidated the metaphysical postulates underlying scientific materialism by demonstrating that atoms and subatomic particles are not solid objects – they do not exist in definite places and times. Indeed, in the quantum domain, atoms and subatomic particles show "tendencies to exist,"[5] shaping a world of possibilities rather than things or facts. QM has thus "dematerialized" the world by showing that it is not at all composed of small grains of matter comparable to tiny billiard balls.

QM also demonstrated the need to introduce the mind into its basic conceptual structure since it has been discovered that the particles observed and the observer – the physicist and the method used for observation – are related. This is called "the effect of the observer." This phenomenon reveals that the physical world is not the only or primary component of reality, and it cannot be fully understood without referring to the mind. In other words, as Wolfgang Pauli, one of the founders of QM, said, our reality consists of two complementary but distinct aspects: the physical and the psychological, *physis* and *psyche*.

The effect of the observer has led some of the pioneers of QM – for instance, Max Planck, Erwin Schrödinger, John von Neumann and Eugene Wigner – to propose that the consciousness of the observer is vital for the existence of measured physical events, and that mental events can influence the physical world. The results of recent studies support this interpretation (we will come back to this topic later).

Non-locality (or non-separability) is another important discovery in QM. This principle is based on entanglement, which refers to persistent instantaneous connections between particles (e.g., photons or electrons) that interacted together before being separated. Surprisingly, these connections persist even if the particles in question are separated by huge distances (for example, billions of light-years). This counterintuitive aspect of nature, which was described by Albert Einstein as a "spooky action at a distance," has been confirmed experimentally in several laboratories since the 1970s. Non-locality and entanglement suggest that the universe is an indivisible whole. As I will demonstrate in this book, the principle of non-locality does not seem to be confined to the microphysical domain since it also exists in the world of the *psyche*.

It is a pity that even though QM has invalidated the metaphysical postulates of materialism, some scientists and

philosophers, by ignorance or bad faith, still cling to this superstition. Some of them, the "fundamaterialists,"[6] behave like true religious fanatics to defend this erroneous and obsolete system of beliefs.

A Pivotal Event

A few years ago, in collaboration with psychology researchers Gary Schwartz from the University of Arizona and Lisa Miller from Columbia University, I helped organize the International Summit on Postmaterialist Science, Spirituality and Society. The purpose of this meeting, held in Tucson in February 2014, was mainly to analyze the various types of empirical evidence supporting postmaterialist science. There was also a discussion about the evolution and recognition of a postmaterialist paradigm, as well as its potential impact on spirituality and society. Internationally-recognized scientists, from various fields of expertise – including biology, neuroscience, psychology, medicine and parapsychology – took part in this pivotal event.

The conclusions of the summit were published a few months later in the form of a document entitled *Manifesto for a Post-Materialist Science*. This manifesto was published in the scientific journal *Explore: The Journal of Science and Healing*. Since its publication, more than 300 scientists and philosophers from around the world, including some very prestigious ones, have signed this document.[7]

Some have criticized this manifesto by saying that my colleagues and I are non-conformist scientists, and that our point of view does not represent the dominant view. However, as noted in a highly complimentary article about us by Dave Pruett[8] – a former NASA researcher and Emeritus Professor of Mathematics at James Madison University: "We must not forget that neither Copernicus nor Galileo nor Kepler nor Einstein represented the current and dominant scientific position. These

great minds questioned the scientific status quo, and we eventually ruled in their favor and accepted their theories."

Our postmaterialist science summit also led to the *Open Science Campaign* and the creation of a website of the same name. The site is a portal promoting research that goes beyond the dogmas that still significantly influence contemporary science. The main areas of research covered include studies on consciousness, integrative medicine and healing, postmaterialistic scientific approaches, as well as novel aspects of cosmology, physics, chemistry and biology. The website refers to books and provides access to videos, articles and links to sites of researchers and organizations known for their open-mindedness.

More recently, I participated in the writing and editing – in collaboration with Gary Schwartz, Natalie Dyer, a young neuroscientist at Harvard University, and Marjorie Woollacott, another neuroscientist – of an anthology entitled *Expanding Science: Visions of a Postmaterialist Paradigm*.[9] Several researchers, visionary and innovative, from various disciplines (e.g., Amit Goswami, Rupert Sheldrake, Larry Dossey, Pim van Lommel, Gary Schwartz and Dean Radin) as well as a few philosophers contributed to this work. Its main objective is to analyze the empirical evidence challenging the materialist position. This anthology discusses, from multiple stances, the emerging postmaterialist paradigm and its implications, and the broadening conceptual scientific framework. This important work targets nonspecialized readers.

A short time ago, I attended yet another important meeting, also held in Tucson, Arizona. This meeting marked the creation of *the Academy for the Advancement of Postmaterialist Sciences (AAPS)*. One of the goals of this organization is to promote cultural change in connection with our understanding of human experience and reality. To achieve this, the academy encourages

scientists, in various ways, to go beyond the limits imposed by an exclusively materialist and reductionist approach to science.[9]

Along the same lines, a few years ago, the Scientific and Medical Network (SMN, www.scimednet.org) – a worldwide professional community and membership organization for open-minded, rigorous and evidence-based enquiry into themes bridging science, spirituality and consciousness – created the Galileo Commission. The main goal of this project is to find ways to expand science so that it can explore and accommodate important questions and human experiences that mainstream science is unable to integrate. Following widespread consultation with 90 advisers representing 30 universities worldwide, the SMN published the Galileo Commission Report, a groundbreaking document (entitled *Beyond a Materialist Worldview: Towards an Expanded Science*) written by Professor Dr. Harald Walach, a researcher at the interface between medicine, psychology and consciousness studies.

The Reasons behind This Book

Even though QM appeared almost a century ago, most people – and even scientists who are not physicists – unfortunately remain unfamiliar with its fascinating and profound implications. They are therefore unaware that this branch of physics demonstrates that the metaphysical postulates of scientific materialism are not valid. Therefore, a significant part of society remains under the influence of a mechanist, materialist and reductionist view of the world. For example, different spheres of human activity – like politics, economics, education, health and the media – are still guided in part by this outdated concept which we need to get rid of.

This is a propitious situation for some materialists who are also militant atheists, such as scientists Richard Dawkins, Lawrence Krauss, Richard C. Lewontin and Paul Zachary Myers,

as well as philosophers Daniel Dennett, Patricia Churchland and André Comte-Sponville. These advocates of rationalism are actively involved in a cultural war against religion and claim to represent ultimate cognitive authority. They maintain the naive and presumptuous belief that neuroscience will eventually be able to completely reduce the mind and consciousness to what is happening in the brain. What should be noted about this is that this prophetic belief, which philosopher of science, Karl Popper, called "*promissory* materialism," had already been professed by proponents of atheistic materialism during the eighteenth century.

Materialist theories miserably fail to explain how the brain could produce mental functions and consciousness. These theories are also unable to explain what the philosopher David Chalmers calls "the hard problem of consciousness": why and how the experiential aspects of our mental lives (which philosophers call the *qualia*), which we access by introspection, result from the activity of a group of neurons in the brain? Why do certain physical states of the brain cause lavender to look purple or for it to be painful to be stung by a wasp?

To better understand the mind-brain relationships, we must leave the suffocating and limiting framework of scientific materialism and consider all research on consciousness. These highlight a whole array of empirical evidence which, like discoveries in QM, are totally incompatible with the old materialist paradigm.

This empirical evidence is meticulously analyzed in this book. This includes the mental ability to influence brain activity, psychosomatic network and genes; psi phenomena such as telepathy, distance vision, precognition, mental influence on physical systems and living organisms; phenomena associated with death such as near-death experiences, shared death experiences, and deathbed visions; reincarnation; and

transcendent experiences. In the last section of this book, I present my view of the main elements that make up the postmaterialist paradigm. Many of my colleagues and I are convinced that this paradigm will lead us to the next great scientific revolution. The implications of this new paradigm are therefore tremendous, both for everyday life on an individual level and for the future evolution of our species.

May this book transform your life by finally liberating you from the materialist straitjacket.

Chapter 1

Thoughts that Transform the Body

Your worst enemy cannot harm you as much as your own thoughts, unguarded. But once mastered, no one can help you as much.
The Buddha

A Few Fundamental Dogmas in Neuroscience

Every human being – religious, scientist or atheist – needs to believe in something. In the case of atheists, they believe in "nothingness" after death, even though they hold no evidence of it. They also believe that God – or a transcendent principle at the origin of the world – does not exist. With respect to scientists and Science, and with science being a product of human activity, it is not immune to prejudices and dogmatic beliefs. This is particularly obvious when most scientists who work in a specific area of research embrace a dogma extensively. The impenetrable truth status attached to Darwinism in biology proves the impact that such a phenomenon can have.

For more than a century, neuroscience researchers have believed that new neurons could not develop in the adult human brain – we were born with a maximum number of neurons, and this would only dwindle throughout our life. Neuroscientists also believed that the adult brain was a static machine that did not have the ability to change. However, in recent decades, this dogma has been cast aside in light of several studies that have convincingly shown that parts of the human brain, as well as many animal species, retain the ability to produce new neurons

throughout adult life. According to these studies, contrary to what we thought, the adult human brain is very plastic. Indeed, it constantly alters its structure and function by creating new neurons and synaptic connections between neurons. In addition, in the mature brain, existing neural networks are constantly reorganized, and new networks are developed. This neuroplasticity indicates that we are not prisoners of the brain we inherited at birth.

As mentioned in the introduction, another fundamental dogma in neuroscience, one that remains influential, is the idea that all mental events, consciousness and the self are simply reducible to the physical and biological processes of the brain. In this regard, different materialist theories have tried to explain how the brain produces the mind. One of them is the theory of psychophysical identity. This theory claims that we comprehend our mental processes and our consciousness in the first person, that is, from within and subjectively ("I feel happy."); while with neuroscience techniques, our brain activity is measured in the third person, that is externally and objectively ("My brain releases more serotonin when I am happy."). In other words, mental events and brain events are perfectly parallel, like two sides of the same coin. However, it is brain states, electrical impulses, and chemical reactions in our brain that create mental states, not the other way around. Most contemporary neuroscientists stand by this view, including Gerald Edelman and Jean-Pierre Changeux.

Eliminativism is another prominent materialist theory about the relationship between mind and brain. The philosophers Paul and Patricia Churchland, as well as Daniel Dennett, are illustrious supporters of this radical theory that denies the existence of mental events: our mental world is just an illusion, and we are only imagining having sensations, memories, emotions and thoughts. Eliminativism recognizes only the

biophysical processes of the brain. It posits that "mind," "consciousness," "ego," and "free will" are prescientific concepts that stem from naive and simplistic ideas belonging to "popular psychology." Proponents of this theory hope that these concepts will soon be eradicated thanks to advances in neuroscience. As to *qualia* – how things appear to us individually, Daniel Dennett vehemently claims that these experiential aspects of our mental lives are also mere illusions.

Those who support materialist theories often incorrectly claim that methods in neuroscience – like, for example, brain imaging techniques – measure mental events. This cannot be more wrong because these events are not physical. Indeed, a thought has no shape, no mass, and no volume. Materialists also often claim that studies using these methods demonstrate that the brain generates both mind and consciousness. They believe that the fact that mental functions are affected when the brain is damaged strongly supports this concept.

This conclusion is inaccurate because neuroscience methods only allow us to measure correlations – that is, reciprocal relations – between cerebral states and mental events. Hence, when the state of the brain changes, mental activity also changes; and when mental activity changes, the state of the brain also changes. However, the correlations between mental activity and brain activity do not imply causality and identity. For example, researchers can record the electrical activity of the brain using electroencephalography (or EEG). Electrodes are applied to the scalp of subjects while they experience a feeling induced by emotionally charged images. However, the brainwaves recorded by the EEG are completely different from the emotions that are experienced by the subjects. Moreover, the correlation between the electrical activity of the brain and the variation of the emotional state of the subject does not mean

that the changes in the EEG are the cause of the changes reported in the emotional state.

The flawed belief about the identity of mental events and their neural correlates leads to what has been called the "mereological fallacy": the erroneous attribution of mental properties to parts of the brain or to the brain itself.[10] The materialists who commit this error elevate the brain to the level of an omnipotent physical entity, whose properties make it possible to explain all mental phenomena. These materialists do not seem to realize that it is the person – not their brain – who is conscious, who thinks, who decides and who believes.

The Compelling Placebo Effect

David Kallmes is an affiliated neuroradiologist at the renowned Mayo Clinic, whose headquarters are in Rochester, Minnesota. During the last two decades, Kallmes has performed many vertebroplasties. Conducted under continuous radiographic control, this surgical technique allows for the restoration of a vertebral fracture by injecting a type of bone "cement." The cement is completely hard after a few hours, and twelve hours later, the patient can stand up.

Vertebroplasty produces impressive results even when the wrong vertebra is accidentally filled with cement. This peculiarity intrigued David Kallmes. Suspecting that other factors were responsible for the effectiveness of this medical procedure, he decided to conduct a study to determine if vertebroplasty was more effective than a placebo – a treatment that has no biological action but can be effective when the person receiving the placebo thinks they are receiving active treatment.[11]

Doctors are aware that the beliefs and expectations of their patients, when it comes to treatments, may affect the results of these treatments. In clinical trials, medical researchers consider

the placebo effect a nuisance since this phenomenon prevents the conclusion of whether the new experimental treatments are effective. To circumvent this problem, participants in clinical trials are randomly assigned to either the group receiving the true (active) treatment, or to the one receiving the fake treatment (placebo, for example, a sugar pill). Neither researchers nor participants have access to this information before the end of the tests. This is called the double-blind randomized clinical trial protocol, with a control for the placebo effect. When the clinical trial is complete, researchers subtract the placebo effect from the real treatment.

In this particular case, Dr. Kallmes and his colleagues developed a clinical trial in which some patients would receive true vertebroplasty while other patients would receive placebo surgery. To ensure that the 130 participating patients at the clinical trial could not know if they received the active treatment or the false treatment, they were prepared for their "operation" in the same way: they were brought into the operating room and then they were injected with an anesthetic agent in the back. Then a computer program randomly decided which patients would receive vertebroplasty or placebo. For both types of procedure, the doctors opened the container containing the bone cement, which gives off a strong smell akin to nail varnish solvent.

Half of the patients received vertebroplasty, while the other half received the fake surgery. For the placebo patients, the doctors adhered to the following scenario: they pressed the patients' backs and told them: "The cement is entering now, everything is fine, a few more minutes and everything will be over."[11]

Bonnie Anderson was one of the patients recruited for this clinical trial. She had a broken vertebra after a fall in her kitchen. Bonnie could hardly move due to the acute pain, and

she could only walk by holding on to things. However, one week after the surgery, this 76-year-old woman could play golf again. What is remarkable in her case is that Bonnie received the fake surgery. The placebo procedure was also effective for several other patients who participated in this clinical trial. So effective that there was no statistically significant difference in terms of decreased pain relief and functional improvement between patients in both groups.

The research results indicate that the placebo effect is involved in all types of medical and psychological treatments. Thus, the meta-analyses – which are statistical analyses combining the results of several studies to more accurately assess the true magnitude of the phenomenon being studied (or "effect size") – indicate that the placebo effect plays a crucial role in clinical trials for drugs targeting mood disorders such as major depression. In this regard, clinical researchers and psychologists Irving Kirsch and Guy Sapirstein examined the results of more than 19 clinical trials involving more than 2,000 patients. These researchers found that 75% of therapeutic outcomes are attributable to the placebo effect.[12]

Research on the placebo effect also reveals that the more we believe in a given treatment and trust a therapist – it does not matter if it's a Western medicine doctor, a homeopath or a shaman – the more likely it is that the treatment will be effective and mobilize our powerful innate mechanisms of self-healing. Hope, positive emotions, motivation, anticipation of improvement, and a warm and thoughtful attitude on the part of the therapist also contribute to induce a strong placebo response.

Administering a placebo does not always trigger the desired self-healing mechanisms. It can sometimes lead to unwanted and unpleasant symptoms such as drowsiness, nausea, fatigue and insomnia. This phenomenon is called the nocebo effect and

represents the dark side of the placebo effect. It can occur when our expectations of a treatment are negative rather than positive. If the administration of a treatment is accompanied by warnings related to potential side effects, these negative effects are more likely to occur. In the book *Love, Medicine and Miracles*, Dr. Bernie Siegel, a now retired pediatric surgeon, cites a study that aimed at testing a new chemotherapy drug. Patients randomly assigned to the placebo group were informed that they could receive this new drug, and that it could have negative side effects. Even though these patients received only one saline injection, 30% of them lost their hair.[13]

The nocebo effect is also observed with real drugs. For example, in a clinical trial, finasteride was given to men suffering from prostate enlargement. Half of the participants in this clinical trial were warned that this drug could produce erectile dysfunction, while the other half of the participants were not informed of this potential side effect. In the informed group, 44% of participants reported that they were experiencing erectile dysfunction, while this side effect was reported by only 15% of participants in the uninformed group.[14]

The nocebo response is not unique to clinical trials. Thus, after the sarin gas attack on the Tokyo subway in 1995, hospitals in this Japanese megalopolis were overwhelmed by cases of individuals who believed they had been exposed to this deadly neurotoxic substance. These individuals had symptoms that had been highly publicized, such as nausea and dizziness. It turned out that these individuals had not really been exposed to sarin. This type of reaction is common when the agent is not visible, such as radiation and some chemicals.[15]

The different types of placebo reactions are associated with various changes in brain activity. This phenomenon is well illustrated by the cerebral response of patients suffering from Parkinson's disease, a degenerative neurological disorder

characterized by tremors, slowing of mobility and muscle rigidity. In this neurological disease, there is a marked decline in the amount of dopamine, a chemical messenger, found in basal ganglia (also called basal nuclei). In a positron emission tomography (PET) scanner, researchers scanned the brains of Parkinson's patients to compare brain responses to apomorphine – a drug that activates dopamine – and salt water – a placebo treatment. Both treatments were administered following a double-blind protocol. Placebo treatment was presented as stimulating mobility. Compared to those who received no treatment, placebo patients showed a dramatic increase in dopaminergic activity in the basal ganglia. This increase was comparable to that observed with the therapeutic dose of apomorphine given to other patients.[16]

The nocebo response is also accompanied by significant changes in brain activity. For obvious ethical reasons, very few neuroimaging studies have been conducted to examine the brain's response to negative expectations. The few studies that have been conducted in this regard focus on pain. These studies reveal that negative expectations lead to an amplification of pain – the more the degree of anticipated pain increases, the more the brain regions involved in the perception of pain become activated. Conversely, expectations of decreased pain reduce the activation of brain regions related to the treatment of pain information.[17]

Managing Emotions

Emotions are physiological changes in terms of heart rate, blood pressure, muscle tension, skin temperature, etc. in response to events occurring either in the external environment (for example, seeing a wild animal close to us in a split second while strolling in the forest), or in the internal environment, that of the *psyche* (for example, the recollection of a memory that is

dear to us). These multidimensional responses also involve a cognitive analysis of what is happening in the environment (internal or external), behavioral expressions (for example, defending oneself in response to a threat) as well as changes in subjective experience – that aspect of emotions called feeling (for example, being scared).

Our emotions play a crucial role in our life – they help us make choices about the people, events and situations we encounter during our lifetime. However, when our emotions are repeatedly negative, multiple problems and enormous suffering may ensue.

The physiological aspects of emotions are closely related to brain regions that are part of what is commonly called the emotional brain (in neuroscience jargon: the limbic system). These areas are ancient, from a phylogenetic point of view, and are found in all mammals.

Luckily, most members of our species can learn to control their emotions. Otherwise, the innermost impulses in our archaic emotional brain would completely overwhelm us. This vital capacity for the future of humanity is mediated by some subdivisions belonging to the prefrontal lobe, the most recent brain structure in terms of our biological evolution. Compared to other mammals, the prefrontal lobe is much more developed and bulkier within our species. This structure, sometimes called the "Organ of civilization," is considered as the key region for implementing the rational aspect of the mind.

There are important anatomical connections between the various regions of the prefrontal lobe and those that are part of the emotional brain. Connections from the prefrontal lobe to the emotional brain transmit inhibitory information, which allows voluntary control of emotions and feelings that accompany the activity of limbic structures. This capacity is one of the main components of emotional intelligence.[18]


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